CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
850 Marina Bay Parkway, Richmond, CA 94804

ENVIRONMENTAL MANAGEMENT BRANCH
Marine Biotoxin Monitoring Program

Monthly Marine Biotoxin Report

August 2008

Technical Report No. 08-25

INTRODUCTION:

This report provides a summary of biotoxin activity for the month of August, 2008. Ranges of toxin concentrations are provided for the paralytic shellfish poisoning (PSP) toxins and for domoic acid (DA). Estimates are also provided for the distribution and relative abundance of *Alexandrium*, the dinoflagellate that produces PSP toxins, and *Pseudo-nitzschia*, the diatom that produces domoic acid. Summary information is also provided for any quarantine or health advisory that was in effect during the reporting period.

Please note the following conventions for the phytoplankton and shellfish biotoxin distribution maps: (i) All estimates for phytoplankton relative abundance are qualitative, based on sampling effort and percent composition; (ii) All toxin data are for mussel samples, unless otherwise noted; (iii) All samples are assayed for PSP toxins; DA analyses are performed as needed (i.e., on the basis of detected blooms of the diatoms that produce DA); (iv) Please refer to the appropriate figure key for an explanation of the symbols used on the maps.

Southern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several sampling stations during August (Figure 1). This dinoflagellate was observed in very low numbers at several sites throughout San Luis Obispo County. The distribution of

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Figure 1. Distribution of toxin-producing phytoplankton in Southern California during August, 2008.

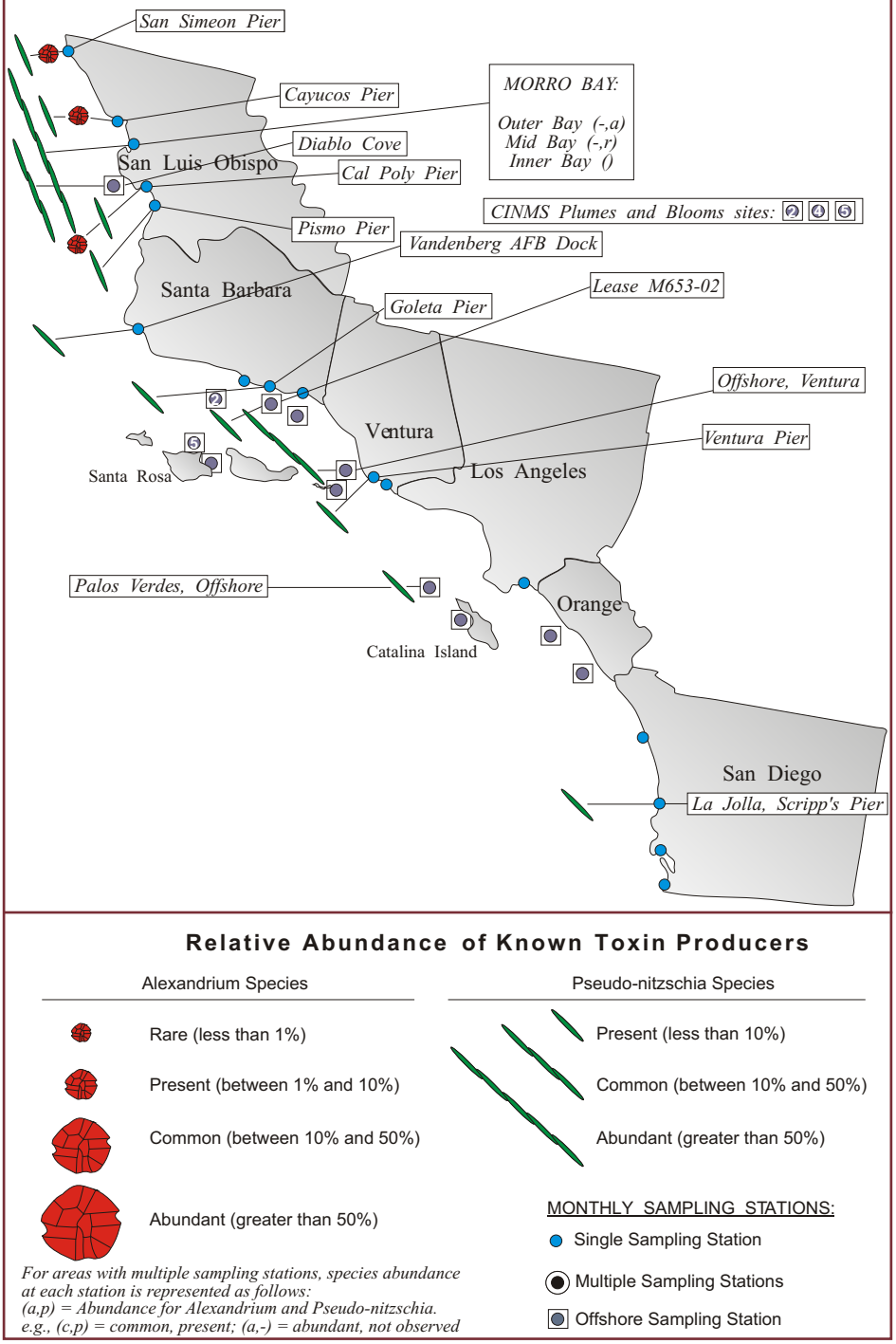
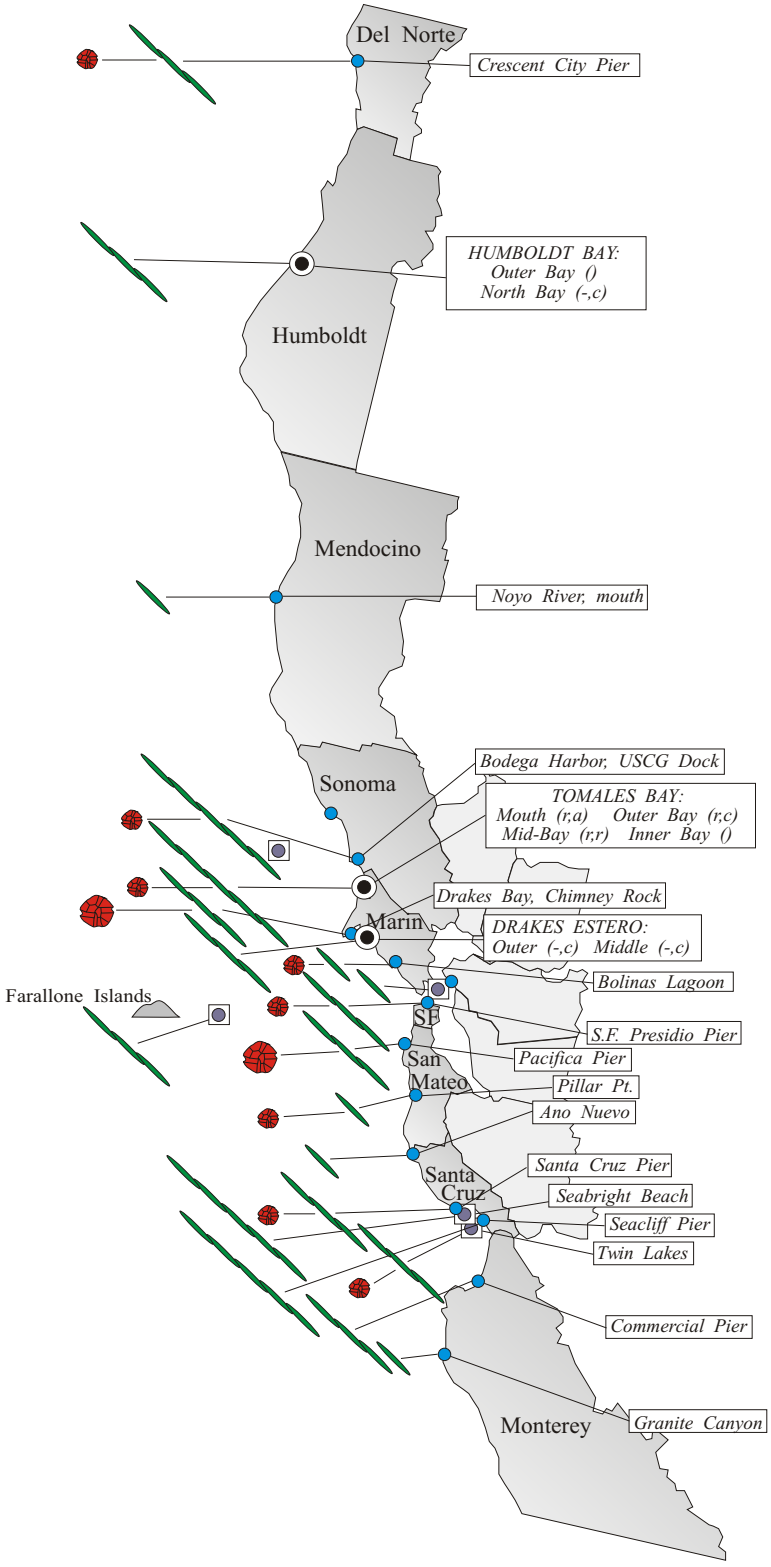


Figure 2. Distribution of toxin-producing phytoplankton in Northern California during August, 2008.



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Alexandrium in August was noticeably reduced compared to observations in July. PSP toxins were not detected in any shellfish samples collected in August (Figure 3).

Domoic Acid

Pseudo-nitzschia was detected at numerous sites between San Luis Obispo and San Diego counties (Figure 1). The distribution of this diatom was similar to observations in July but the relative abundance decreased significantly in most areas. The exception to this general trend of declining numbers was outer Morro Bay (San Luis Obispo County), where *Pseudo-nitzschia* increased in relative abundance compared to observations in July. *Pseudo-nitzschia* numbers declined rapidly at this site by August 21. Domoic acid was not detected in any shellfish samples collected along the southern California coast in August (Figure 3).

Non-toxic Species

While diatoms represented the major group of phytoplankton observed inside Morro Bay, the majority of the other coastal sampling locations were dominated by dinoflagellates. *Cochlodinium* was common in a sample from Pismo Pier (San Luis Obispo County) on August 13. Other common dinoflagellates included *Ceratium* and *Prorocentrum*.

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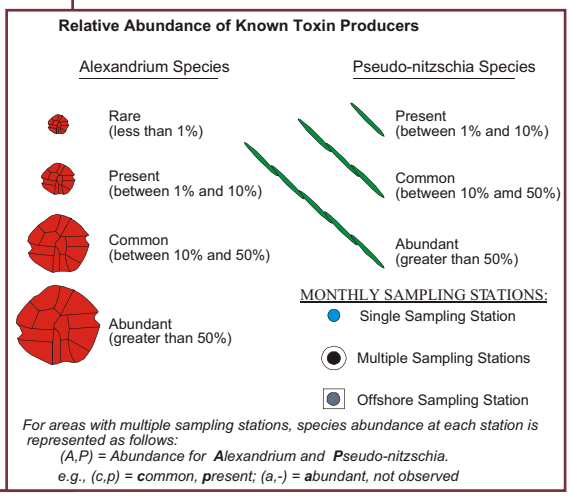
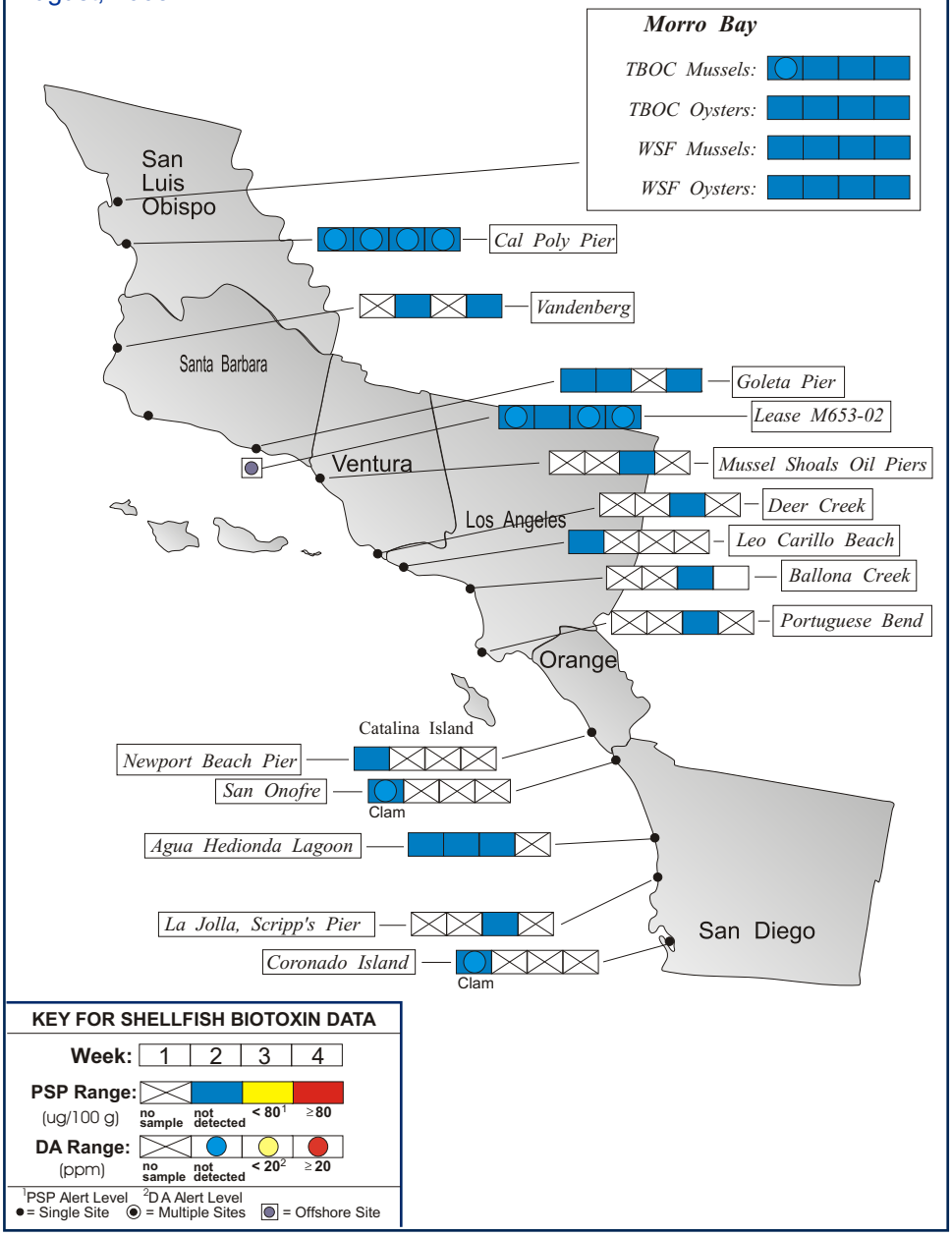


Figure 3. Distribution of shellfish biotoxins in Southern California during August, 2008.



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Northern California Summary:

Paralytic Shellfish Poisoning

Alexandrium was observed at several northern California sampling sites in August (Figure 2). This dinoflagellate was observed at sites between Sonoma and Santa Cruz counties, as well as farther north in Del Norte County, representing a slight increase in its distribution. The relative abundance of *Alexandrium* increased noticeably at sites in Marin and San Mateo counties.

PSP toxicity was first detected in shellfish samples from Marin and Humboldt counties during the third week of the month (Figure 4). Of special note is the rapid increase in PSP toxins at our sentinel station in outer Drakes Estero. Mussels from this site increased from nondetectable levels on August 12 to 200 ug/100g on August 19, well above the alert level of 80 ug/100 g. This sudden increase may suggest the transport of cells into the area rather than the gradual emergence of vegetative cells from local resting cysts. Toxin levels continued increasing throughout the month in Marin, reaching 293 ug in outer Drakes Estero and 99 ug at Chimney Rock. Low levels were also detected mid-Estero and in

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The Marine Biotoxin Monitoring and Control Program, managed by the California Department of Public Health, is a state-wide effort involving a consortium of volunteer participants. The shellfish sampling and analysis element of this program is intended to provide an early warning of shellfish toxicity by routinely assessing coastal resources for the presence of paralytic shellfish poisoning (PSP) toxins and domoic acid.

The Phytoplankton Monitoring Program is a state-wide effort designed to detect toxin producing species of phytoplankton in ocean water before they impact the public. The phytoplankton monitoring and observation effort can provide an advanced warning of a potential toxic bloom, allowing us to focus sampling efforts in the affected area before California's valuable shellfish resources or the public health is threatened.

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(510) 412-4635

For Recorded Biotoxin Information Call:
(800) 553 - 4133

(Continued from Page 3)

outer Tomales Bay by the last week of August. The absence of *Alexandrium* in June, followed by the detection of its presence in July, proved to be a significant observation relative to its continued increase in August and the detection of significant concentrations of the PSP toxins in shellfish.

Domoic Acid

Pseudo-nitzschia increased in relative abundance at sites between Del Norte and Monterey counties (Figure 2). The highest relative abundances were observed in Bodega Harbor, Tomales Bay, and Chimney Rock. Mussels from the latter site contained a low level of domoic acid on August 25.

Non-toxic Species

The phytoplankton assemblage along the northern California coast continued to be dominated by diatoms. The most common genera included *Thalassiosira, Ditylum,* and *Skeletonema*.

QUARANTINES:

The annual mussel quarantine went into effect on May 1. The annual quarantine applies specifically to sport-harvested mussels and is in effect for the entire California coastline, including all bays and estuaries. Routine phytoplankton and biotoxin monitoring is maintained throughout the year, not just within the quarantine period. This allows the detection of unexpected increases in biotoxin activity outside of the routine quarantine period. The annual quarantine does not apply to the certified commercial shellfish growing areas in California, which are monitored intensively. All

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Figure 4. Distribution of shellfish biotoxins in Northern California during August, 2008.

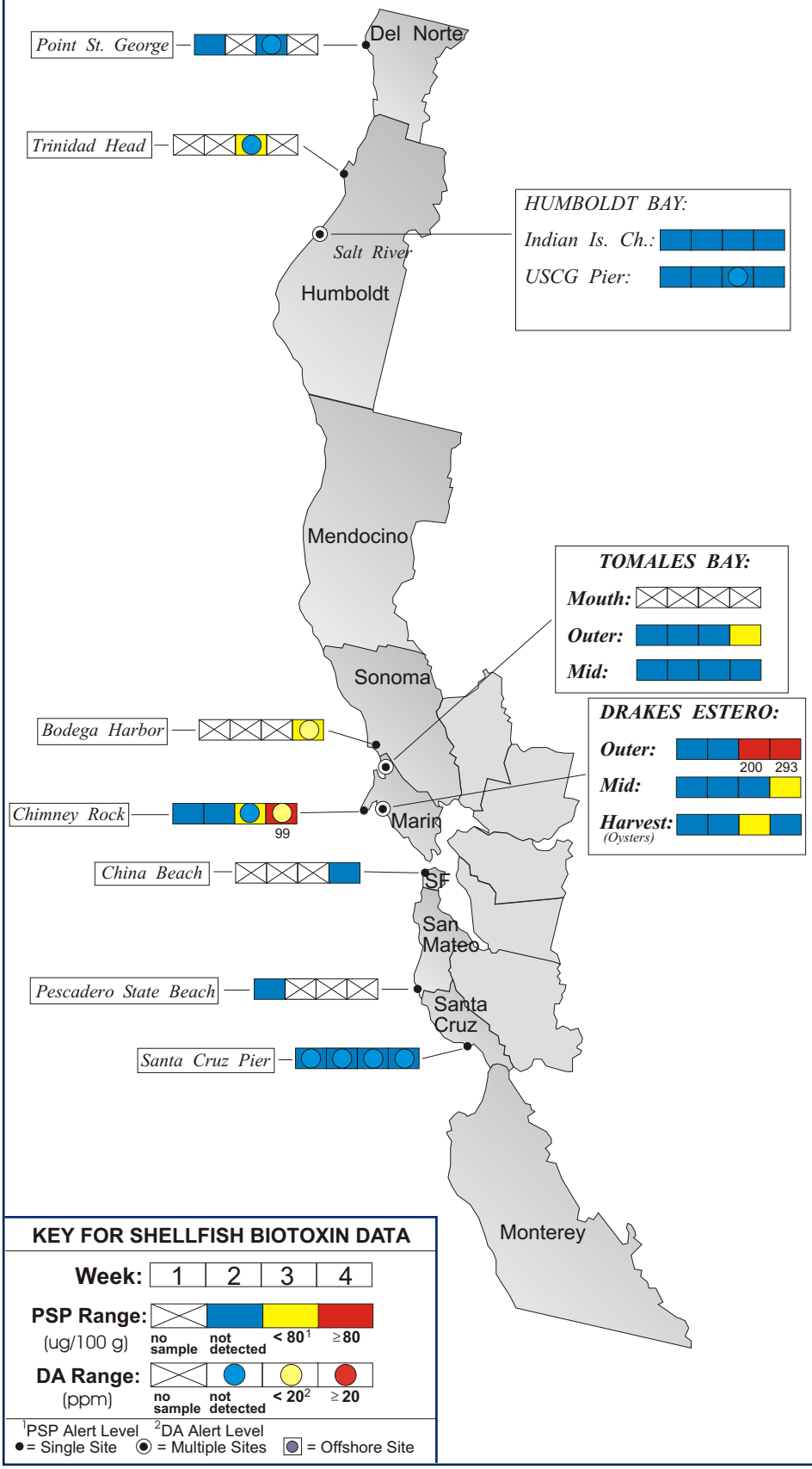


Table 1. California Marine Biotoxin Monitoring Program participants submitting shellfish samples during August, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	8
	Humboldt County Environmental Health Department	1
Mendocino	None Submitted	
Sonoma	CDPH Marine Biotoxin Monitoring Program	1
Marin	Bernal Brothers	1
	Cove Mussel Company	4
	Drakes Bay Oyster Company	24
	Hog Island Oyster Company	7
	Marin Oyster Company	4
	CDPH Marine Biotoxin Monitoring Program	8
	Tomales Bay Oyster Company	1
San Francisco	San Francisco County Health Department	1
San Mateo	None Submitted	
Santa Cruz	U.C. Santa Cruz	4
Monterey	None Submitted	
San Luis Obispo	Cal Poly	4
	Tomales Bay Oyster Company	8
	Williams Shellfish Farms	8
Santa Barbara	Santa Barbara Mariculture Company	8
	U.C. Santa Barbara	3
	Vandenberg AFB	2
Ventura	Ventura County Environmental Health Department	2
Los Angeles	Los Angeles County Health Department	3
Orange	Orange County Health Care Agency	1
San Diego	Carlsbad Aquafarms, Inc.	3
	CDPH Volunteer (*Steve Crooke*)	2
	Scripps Institute of Oceanography	1

certified shellfish growers are required to submit at least weekly samples of shellfish for toxin monitoring. Harvest restrictions or closures are implemented as needed to protect the public's health.

Consumers of Washington clams, also known as butter clams (*Saxidomus nuttalli*), are cautioned to eat only the white meat. Washington clams can concentrate the PSP toxins in the viscera and in the dark parts of the siphon and can remain toxic for a long period of time. Persons taking scallops or clams, with the exception of razor clams, are advised to remove and discard the dark parts (i.e., the digestive organs or viscera). Razor clams (*Siliqua patula*) are an exception to this general guidance due to their ability to concentrate and retain domoic acid in the edible white meat as well as in the viscera. These toxins may also accumulate in the viscera of other seafood species such as crab, lobster, and small finfish like sardines and anchovies.

PSP toxins affect the human central nervous system, producing a tingling around the mouth and fingertips within a few minutes to a few hours after eating toxic shellfish. These symptoms typically are followed by disturbed balance, lack of muscular coordination, slurred speech and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur.

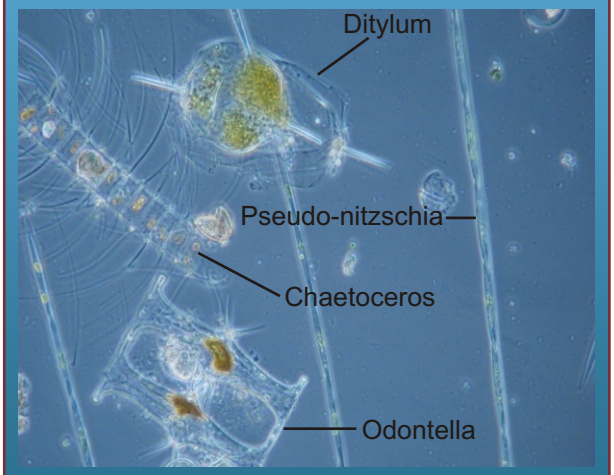
Symptoms of domoic acid poisoning can occur within 30 minutes to 24 hours after eating toxic seafood. In mild cases, symptoms of exposure to this nerve toxin may include vomiting, diarrhea, abdominal cramps, headache and dizziness. These symptoms disappear completely within several days. In severe cases, the victim may experience excessive bronchial secretions, difficulty breathing, confusion, disorientation, cardiovascular instability, seizures, permanent loss of short-term memory, coma and death.

Any person experiencing any of these symptoms should seek immediate medical care. Consumers are also advised that neither cooking or freezing eliminates domoic acid or the PSP toxins from the shellfish tissue. Sport harvesters are encouraged to contact the "Biotoxin Information Line" at 1-800-553-4133 for a current update on marine biotoxin activity prior to gathering and consuming shellfish.

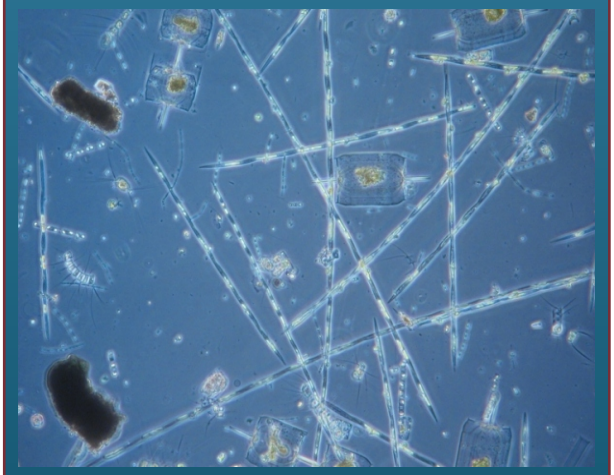
Table 2. Agencies, organizations and volunteers participating in marine phytoplankton sample collection during August, 2008.

COUNTY	AGENCY	# SAMPLES
Del Norte	Del Norte County Health Department	2
Humboldt	Coast Seafood Company	4
Mendocino	California Department of Fish and Game	2
Sonoma	California Department of Fish and Game	1
	CDPH Volunteer (*Cathleen Cannon*)	1
	CDPH Marine Biotoxin Program	1
	Cordell Banks National Marine Sanctuary	1
Marin	CDPH Volunteers (*Brent Anderson,*	7
	Cal *Strobel, Richard Plant)*	
	Drakes Bay Oyster Company	12
	Hog Island Oyster Company	4
	CDPH Marine Biotoxin Program	5
San Francisco	CDPH Volunteer (*Eugenia McNaughton*)	3
	Gulf of the Farallones National Marine Sanctuary	1
	San Francisco Health Department	1
	Cordell Banks National Marine Sanctuary	2
San Mateo	CDPH Volunteer (*Kathleen Abadie*)	3
	San Mateo County Environmental Health Dept.	3
	The Marine Mammal Center (*Stan Jensen*)	4
	U.C. Santa Cruz	2
Santa Cruz	U.C. Santa Cruz	4
	Santa Cruz County Environmental Health Dept.	3
	The Marine Mammal Center (*Nancy Scarborough*)	1
	California Department of Parks and Recreation	5
Monterey	CDPH Volunteer (*Jerry Norton*)	1
	Marine Pollution Studies Laboratory	3
	Monterey Abalone Company	4
San Luis Obispo	CDPH Volunteer (*Renee and Auburn Atkins*)	1
	Cal Poly	11
	Monterey Bay National Marine Sanctuary	5
	Morro Bay National Estuary Program	2
	Tenera Environmental	2
	The Marine Mammal Center (*Tim Lytsell*)	11
	Tomales Bay Oyster Company	3
Santa Barbara	CDPH Volunteer (*Sylvia Short*)	5
	National Park Service	3
	Santa Barbara Channel Keeper	1
	Santa Barbara Mariculture Company	4
	Guided Discoveries, Tole Mour	1
	U.C. Santa Barbara	4
	Channel Islands National Marine Sanctuary	2
	Vandenberg AFB	4
Ventura	CDPH Volunteer (Fred Burgess)	3
	Channel Islands National Marine Sanctuary	3
	Ventura County Environmental Health Department	1
Los Angeles	Los Angeles County Sanitation District	3
	Southern California Marine Institute	1
Orange	Ocean Institute	1
	Orange County Health Care Agency	1
San Diego	Avian Research Associates	3
	Scripps Institute of Oceanography	4
	CDPH Volunteer (*Paul Sims*)	1

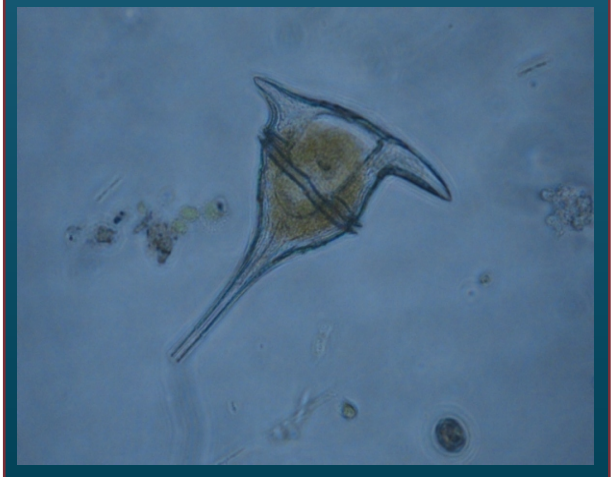
PHYTOPLANKTON GALLERY



The north coast was dominated by a mix of diatoms in August.



Pseudo-nitzschia was abundant inside Bodega Harbor and in outer Tomales Bay.



The dinoflagellate Ceratium was common in samples from southern California.